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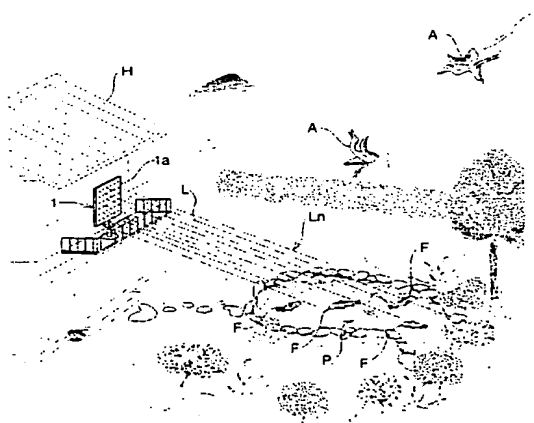
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(71) Applicant (*for all designated States except US*): **KANAI GAKUEN INCORPORATION** [JP/JP]; 6-1, Gakuen 3-chome, Fukui-shi, Fukui 910-0028 (JP). For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A METHOD FOR EXPELLING HARMFUL WILD BIRDS AND BEASTS BY MULTIPLE LASER BEAMS IRRADIATION



(57) Abstract: This invention relates to a cost-saving method for intimidatingly expelling harmful wild birds (A) and beasts by multiple laser beams irradiation wherein said beams hit them on their eyes with the retinas thereof subjected to the excessively intense luminance of the laser beam, the after-effects of which are ever-lasting on the part of those animals. Namely, the present invention adopts such means as convergently irradiating a set of laser beams (Ln) with regard to a space where their invasion is to be hindered so as to form a laser beams net (Ln) in said space, so that any one of those beams is sure to directly hit the invading animals (A) on their eyes with the retinas thereof subjected to the excessively intense luminance of the laser beam. According to this method, there is almost no case where they get used to a trap as in the prior arts, and providing that a laser beams net is left active for some time, they acquire the error of such intense luminance that they come to avoid entering into said space, even if the laser beams irradiation is stopped for quite a long time.

DESCRIPTION

A METHOD FOR EXPELLING HARMFUL WILD BIRDS AND BEASTS BY MULTIPLE LASER BEAMS IRRADIATION

TECHNICAL FIELD

The present invention relates to an improvement upon a method for expelling harmful and undesirable wild birds and beasts, in more details, pertaining to an epoch-making method therefor by multiple laser beams irradiation wherein a set of laser beams is densely irradiated to a space where their invasion is to be hindered to hit them on their eyes with the retinas subjected to the excessive intensity of the laser luminance so as to intimidatingly expel them from such space.

BACKGROUND ART

It is reported that such damage has been recently increasing as done by such wild birds as herons and seagulls on goldfish and carps kept for ornament in both private and public garden ponds and for marketing in commercial facility as well as on fish cultivated for human consumption in such facility and by such beasts and birds as wild monkeys, bears, crows and sparrows on agricultural crops in the paddy rice fields as well as vegetable gardens and orchards, for examples, in the meantime, it is often heard that the crows often pull rubbish and garbage out of the trash cans placed on the sidewalks so as to litter the streets. Therefore, the effective countermeasures against such damage and rampage are anxiously sought after. It is also reported that airplane-

related accidents have been increasing due to the intake of the flying birds such as sparrows and pigeons habitant in the vicinity of airfields into the jet engines, the safety measures against which are also sought after.

The conventional measures against such harmful wild animals-related damage include scarecrows put up in such cultivated lands as paddy rice fields and vegetable gardens as well as orchards, a streamer figured like birds of prey such as an eagle, a hawk, a falcon, or an owl disposed in such areas and the enclosure of such area with several strings of golden or silver-colored tapes to throw back shimmering lights so as to intimidate them. However, the above measures only take temporal effect because the crows and sparrows habitant close to us, among others, get sooner or later accustomed to such inert and inanimate objects as mentioned above and or worse begin to play on them or prick them at last. Of course, the providers to market such objects, especially in the case of the streamers, for example, contrive their moving as if they are alive or being incorporated with a ultrasonic sound wave generator or loudspeakers, but the crows and sparrows get used to such contrivances in a short time, so that we are running short of the effective measures to be taken against them. In turn, such mammals as monkey are intelligent enough to understand that they are fakes, so that they become of no avail at all.

Under the circumstances, in the cultivated lands as well as vegetable gardens and orchards, among others, in order to prevent harmful wild birds and beasts from invasion, such measures have been further taken to date as enclosing

the boundaries of such areas with a rigid fence or covering the whole areas thereof with a sturdy net. However, it costs high to install such equipment at first as well as to repair the same for regular maintenance afterwards. Especially, maintenance cost runs higher in the case of said net, as it is required to be replaced with a new one annually.

Moreover, such methods as using siren sounds or the explosive sounds of unloaded gun fires and crackers or playing another discouraging sounds have been attempted to date, but it is practically impossible to keep on using such explosives and playing such sounds day and night. In turn, it goes without saying that the noise pollution caused by such annoying sounds invites a lot of complaints from the neighboring community.

Thus, the present inventor has once adopted a flush device momentarily emitting intense light as a cost-saving and silent means to expel such wild animals, but as inverse square law applies to this case, by which the intensity of luminance decreases in inverse proportion to square of distance, in order to cover a wider area, a great number of such devices are required to be disposed to take due effect, in addition to which, it is unavoidable to lose effect as soon as after the animals in issue have gotten used to such contrivance.

In the meantime, the present inventor dedicating himself to professorship has once misused a laser pointer, with the result that a laser beam has penetrated into one of his eyes. The penetration last quite a short time, but affected the retina so harshly that his eye became dizzy and

difficult to see at one moment, which incident the present inventor still remembers terrified him instinctively. He was then conceived of the idea that if a laser beam is irradiated against the naked eyes of the wild animals, it might be effective to expel or intimidate them. To put this idea into practice, he has aimed at the flock of herons distant away from him with the laser pointer, but it was ten to one impossible to hit them on the eyes. By chance, when it happened to hit them on the eyes, he found it effective to make them astonishingly and intimidatingly fly away.

Based on the above discovery that irradiating a laser beam against the eyes of the wild animals or subjecting the retinas thereof to the excessive intensity of the laser luminance is highly effective to expel them, the present invention is to provide an effective method for expelling harmful wild animals by hitting them on the eyes with a laser beam or subjecting the retinas thereof to the excessive intensity of the laser beam to intimidatingly expel them.

Further, the present invention is to provide a method for everlastingly expelling and keeping off harmful wild animals by multiple laser beams irradiation capable of enforcing them to instinctively acquire the terror caused by subjecting the retinas of their eyes to the excessive intensity of the laser luminance.

Further, the present invention is to provide a highly economical method for expelling harmful wild animals by multiple laser beams irradiation in view of the relevant equipment and maintenance cost.

DISCLOSURE OF THE INVENTION

Hereafter, the means that the present inventor adopts for solving the above issues is described below.

That is to say, the characteristic feature of the present invention lies in adopting a multiple laser beams irradiation means wherein a set of laser beams is convergently irradiated to the space where the invasion of the wild animals is to be hindered to form a net of laser beams in said space so as to intimidatingly expel such animals entering into said net with the retinas of their eyes subjected to the exceeding intensity of the laser luminance.

The above means can be installed in any buildings, electric power line facilities and any other facilities such as airfields where there is likelihood that the wild birds and beasts enter and do damage on or hamper the normal operation thereof, besides private and public garden ponds, commercial ponds for fish cultivation, and such cultivated lands as rice paddy fields and vegetable gardens, orchards and mushroom cultivation facilities.

As a mechanical means to convergently irradiate laser beams, a laser beams irradiating device with a number of laser beam emitting elements disposed thereon in a certain density is adopted herein, a few examples of which are shown in the accompanying drawings of Figures 5 to 7. In this case, said laser beam emitting element may not be necessarily large in power capacity. Normally, just with a red light emitting semi-conductor laser diode of GaAs compound with power output as in the order of 3 to 5 mW (DC5V/40mA), it is sufficient to irradiate the laser beams against the wild

animals approximately 300 meter away from said device so as to effectively expel them. It is of course that a laser beam emitting element with larger power output can be adopted for said device, but the larger the capacity becomes, the higher the risk in use becomes, so that it is preferable to choose the same within the reasonable range thereof.

The laser beam-emitting element as mentioned above may continuously emit laser beam with a given luminance, but it may blink by means of a well-known circuit system or emit a laser beam with its luminance changed. Alternatively, it is also effective to dispose a detecting sensor (infrared-ray sensor) on a path where the wild animals frequently pass and to actuate said irradiating device by converting a signal output from the sensor detecting their presence into an approach signal.

Moreover, although the spatial coverage of the laser beams net to be formed by said irradiating device depends upon the size of its irradiating section where a number of laser beam emitting elements are disposed, it is also possible to extend such net over the whole area where the invasion of the wild animals is to be hindered by swinging said device up and down as well as turning the same right and left or to enhance the irradiation density of the beams and to further extend the coverage of said net by oppositely disposing reflective mirrors in the space where said device is installed.

Hereinafter, the best mode for carrying out the invention is described with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is an explanatory view of the first embodiment showing the situation where herons are flying over aiming at the goldfish in a garden pond; Figure 2 is an explanatory view of the second embodiment showing laser beams irradiating devices installed on traverse arms of an overhead electric power line supporting tower and a laser beams net formed in the space encompassing said arms so as to prevent the birds from nesting; Figure 3 is an explanatory view of the third embodiment showing a laser beams irradiating device disposed on the veranda and a laser beams net formed therein; Figure 4 is an explanatory view of the forth embodiment showing a laser beams irradiating device forming a laser beams net in engagement with a detecting sensor disposed in the cultivated land facing the mountain side; Figure 5 is a perspective view of a laser beams irradiating device of rectangular type for installation embodied in the present invention; Figure 6 is a perspective view of a laser beams irradiating device of cylindrical type embodied in the present invention; Figure 7 is a perspective view of a laser beams irradiating device of pistol type for manual use.

BEST MODE FOR CARRYING OUT THE INVENTION (FIRST EMBODIMENT)

Figure 1 is an explanatory view of this embodiment showing flying herons (A) aiming at the goldfish (F) in the private garden pond (P). In this embodiment, the space where the invasion of the herons is to be hindered encompasses said pond (P).

As shown, a laser beams irradiating device (1) is disposed on the first-floor veranda of a house (H). A laser beams net (Ln) covering the whole area of the pond is formed by vertically and horizontally swinging an irradiating plane section (1a) of said device.

When the herons (A) descended in the pond (P) where said laser beams net (Ln) is formed, a set of laser beams is irradiated there with so high density that any one of those beams (L) is sure to hit the respective herons on the eyes and to subject the retinas thereof to the excessive intensity of the laser luminance so as to make them astonishingly and intimidatingly fly away.

(SECOND EMBODIMENT)

Figure 2 illustrating the present embodiment shows laser beams irradiating devices (1) disposed on traverse arms (T) of an overhead electric power line supporting tower and a laser beams net (Ln) formed in the space encompassing said arms so as to prevent the birds such as crows and pigeons from nesting on said tower in the case of a residential area while hampering the birds of prey such as hawks and falcons from nesting in the case of a mountainous area.

The formation of the laser beams net in the space covering said arms hampers the crows, however cunning they may be, from approaching to said tower for nesting, so that it avoids causing short circuit in the power line.

(THIRD EMBODIMENT)

Figure 3 illustrating the present embodiment shows a laser beams irradiating device (1) disposed on the veranda (V) of a building and a laser beams net (Ln) formed in the

surrounding space. It hampers the crows and pigeons from approaching to the veranda so as to prevent the veranda from becoming filthy with their excrement and scattering the veranda with garbage pulled out of the trash can as well as from bothering us early in the morning with their fussing and roaming.

(FOURTH EMBODIMENT)

Figure 4 illustrating the present embodiment shows a plurality of detecting sensors (2) (i.e. infrared-ray sensors), which respond to the body temperature of such beasts as monkeys and wild boars when they approach to a vegetable garden (G) facing the mountain side, disposed on a path where they frequently pass and shows a laser beams net (Ln) formed in the surrounding space by actuating a laser beams irradiating device (1) upon receiving an approach signal converted from a signal output from any one of those sensors when it detects those beasts (A) in appearing on the path so as to keep them off.

Economically speaking, the laser beams irradiating device of this embodiment is not necessarily actuated all the time, so that it keeps intact for a long time and its power consumption is saved. If the device keeps actuated all the time, there is no denying that the monkeys belonging to the Primates might learn how to protect themselves before long and enter into a prohibited area with a protection tool against the laser beams on hand. The laser beams irradiating device of this embodiment is arranged such that it is controlled by the detecting sensor, so that there is no room for the invading monkeys to protect themselves or escape

from the laser beams (L).

The present invention has been concretely described up to here with the above first to fourth embodiments, but it should be understood that the present invention is not limited to those embodiments, but it can be modified in various manners according to the type of a space or area where the invasion of the wild animals is to be hindered.

Figure 5 shows one type of a laser beams irradiating device embodied in the present invention, which comprises a rectangular plate provided with an irradiating plane section (1a) on a first side thereof and a post (1b) supporting said plate. Thirty-six laser beam-emitting elements (11) (semiconductor laser diodes of GaAs compound) are disposed on said plane section surface with an interval of 3cm placed between the neighboring elements. The lower end of said post is connected to the driving axis of a motor (12) so that said plane section reciprocally turns at an irradiating angle as required while a transverse axis (1c) to be driven by a motor (13) is fixed on the lower fringe end of said plate so that said plane section swings up and down at an irradiating angle as required. This type of the irradiating device is appropriate for the afore-mentioned first embodiment.

Figure 6 shows another type of a laser beams irradiating device (1), which is characterized in that a number of laser beam emitting elements (11) are disposed on an irradiating section (1a) corresponding to a circumferential surface of a cylindrical body. This type of the laser device is appropriate for hampering the invasion of the wild animals into such cultivated lands as rice paddy fields and gardens

wider in area where the plants of comparatively lower height are cultivated.

Figure 7 shows a portable type of a laser beams irradiating device figured like a pistol, the front side of which corresponds to a gunpoint, plays a role as an irradiating section (1a). A set of laser beams (L) is irradiated from the respective laser beam emitting elements (11) disposed on said irradiating section by triggering a switch (1d) with a finger. This device operates with three AA dry cells (DC 4.5V) charged in the grip thereof.

INDSUTRIAL APPLICABILITY

As described above, since the present invention adopts a means wherein a set of laser beams is convergently irradiated to the space where the invasion of the wild animals is to be hindered so as to form a laser beams net in such space, any one of those laser beams is sure to directly hit the invading wild animals on the eyes with the retinas thereof subjected to such excessive intensity of the laser luminance that there is almost no case where they get used to a trap before long in the same way as in the prior arts. Such result has been obtained that providing a laser beams net is left active for some time, the wild animals instinctively acquire the terror of such intense luminance that they come to avoid entering into a prohibited area even if the laser beams irradiation is stopped for a long time. Moreover, it does not cause noise pollution because it operates silently different from the prior arts, which accompanies explosive and annoying sounds in operation.

The present invention can not only resolve the prior issue of the relevant method for expelling harmful wild animals where they get used to a trap before long, but also highly efficiently expel them with inexpensive laser beam emitting elements and lower power consumption, so that economically and practically speaking, its industrial applicability is very high.

CLAIMS

1. A method for expelling harmful wild birds and beasts by multiple laser beams irradiation comprising the steps of convergently irradiating a set of laser beams to a space where their invasion is to be hindered so as to form a laser beams net in said space and then subjecting the retinas of the invading birds and beasts to the excessively intense luminance of the laser beam so as to intimidatingly expel them from said space.
2. A method for expelling harmful wild birds and beasts by multiple laser beams irradiation according to claim 1 wherein a laser beams net is formed by continuously or intermittently irradiating said laser beams from a number of laser beam emitting elements.
3. A method for expelling harmful wild birds and beasts by multiple laser beams irradiation according to claims 1 or 2 wherein a wide range laser beams net is formed by swinging an irradiating section of a laser beams irradiating device that convergently irradiates a set of laser beams with regard to a space where their invasion is to be hindered.
4. A method for expelling harmful wild birds and beasts by multiple laser beams irradiation wherein a reflective mirror is disposed behind a space that is opposite to an irradiating section of a laser beams irradiating device and where their invasion is to be hindered, and a set of laser beams irradiated from said device is reflected upon said mirror so as to enhance a density of said beams within a laser beams net formed by said set of laser beams.
5. A method for expelling harmful wild birds and beasts by

multiple laser beams irradiation comprising the steps of disposing a detecting sensor to detect their approach in the vicinity of a space where their invasion is to be hindered and actuating a laser beams irradiating device in engagement with an approach signal output by said sensor when it detects their presence so as to irradiate a set of laser beams from said device and to form a laser beams net in said space.

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Fig. 1

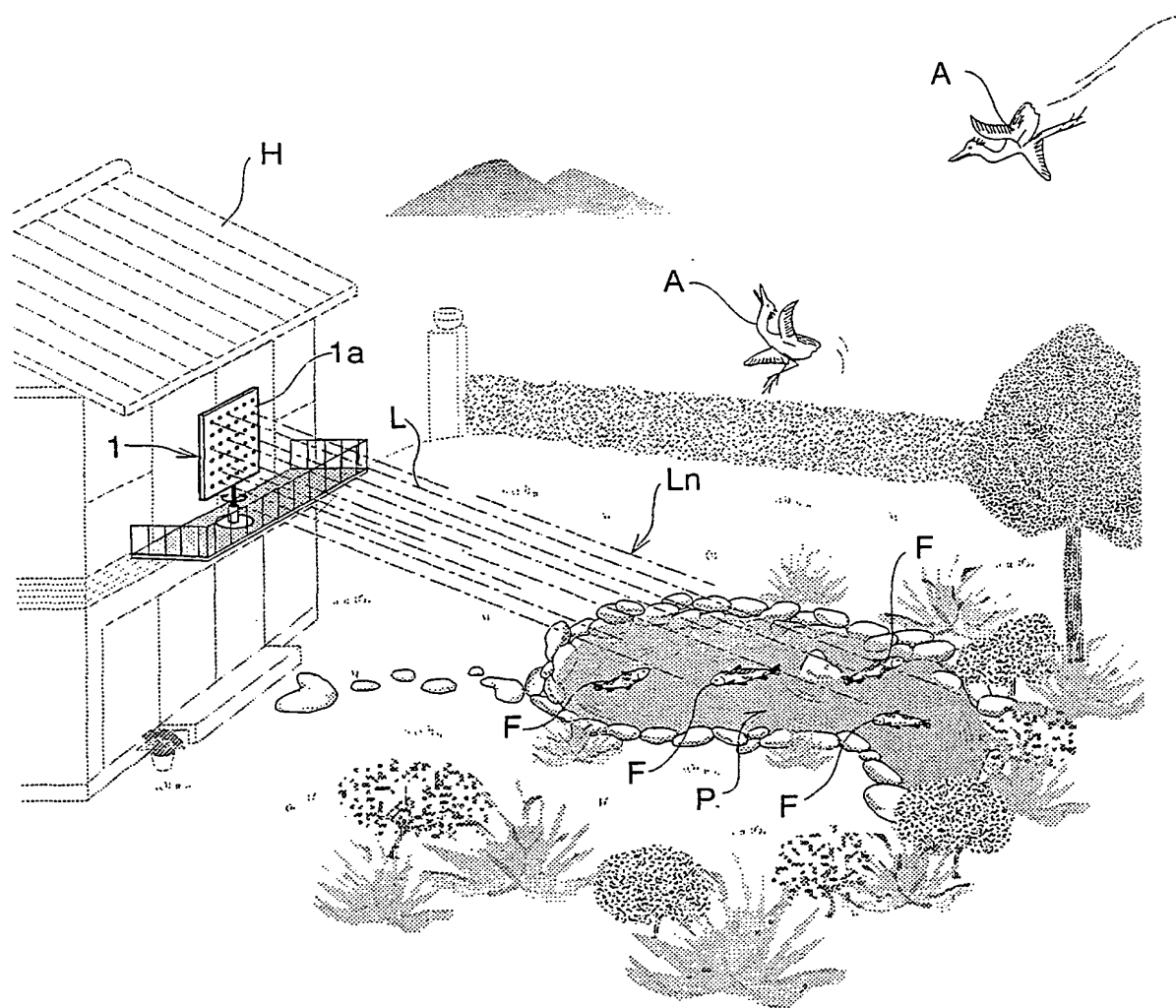
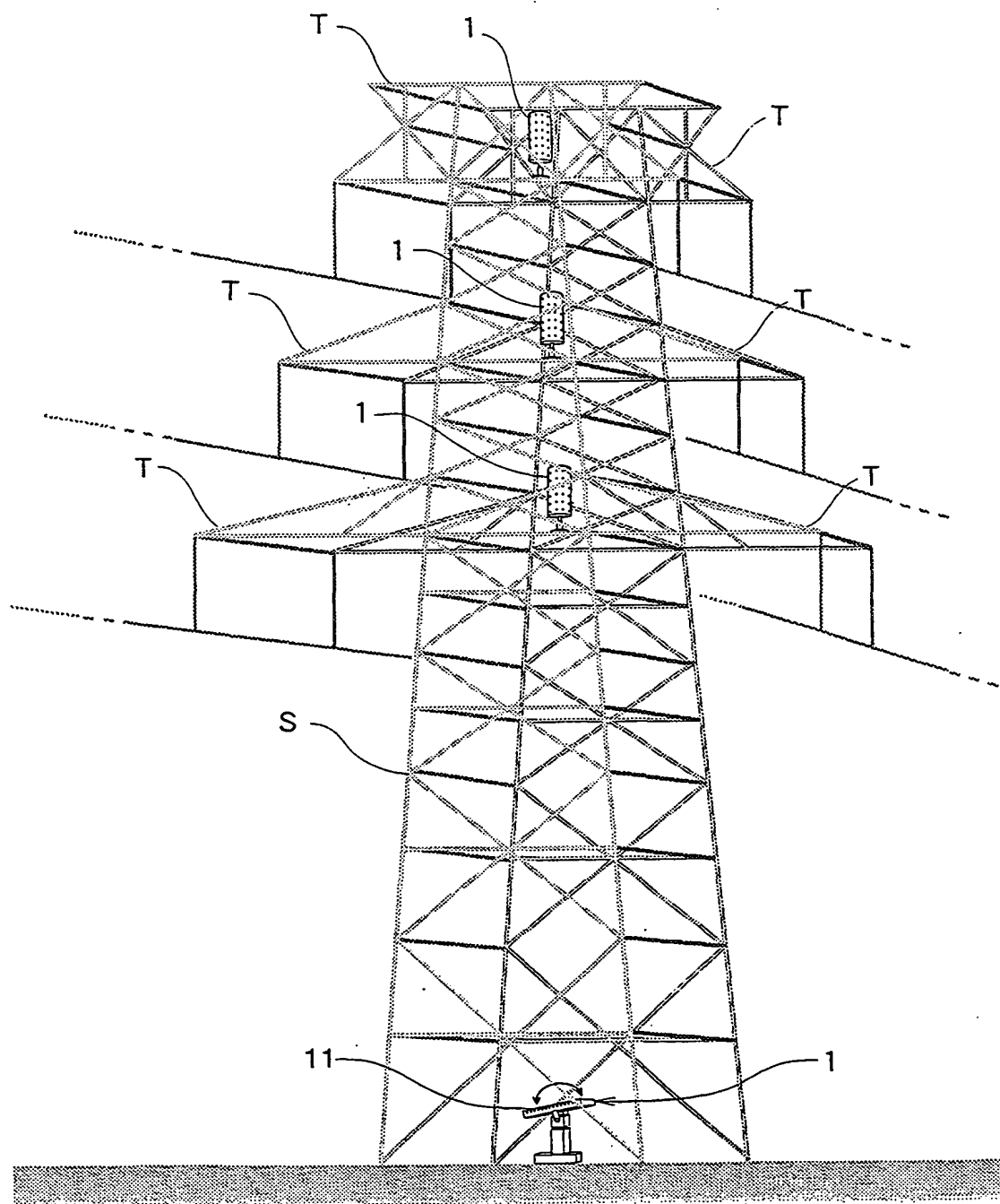
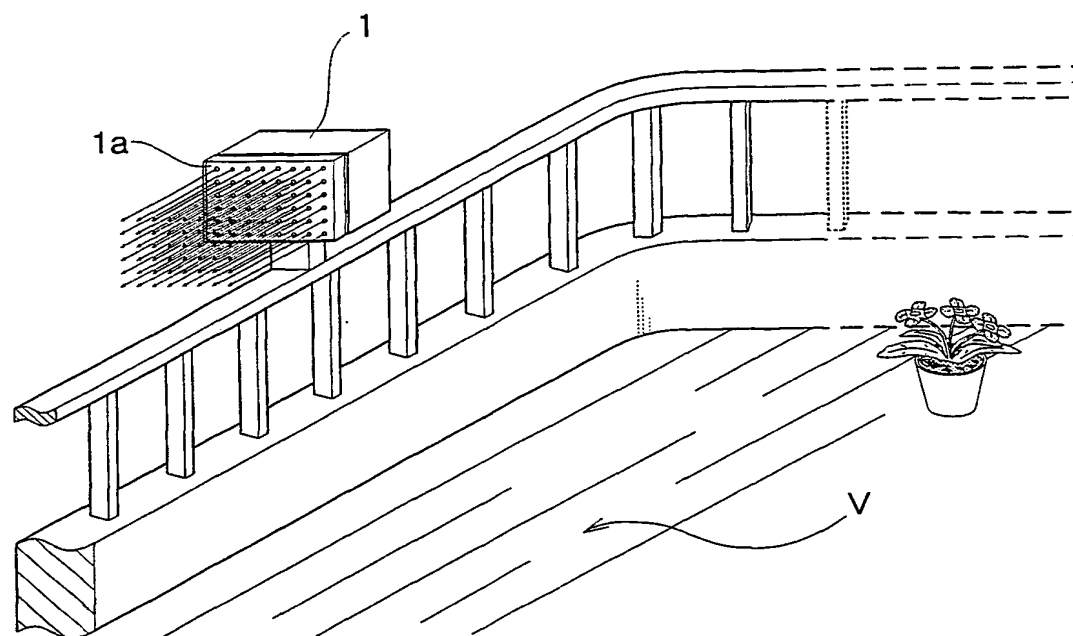


Fig. 2

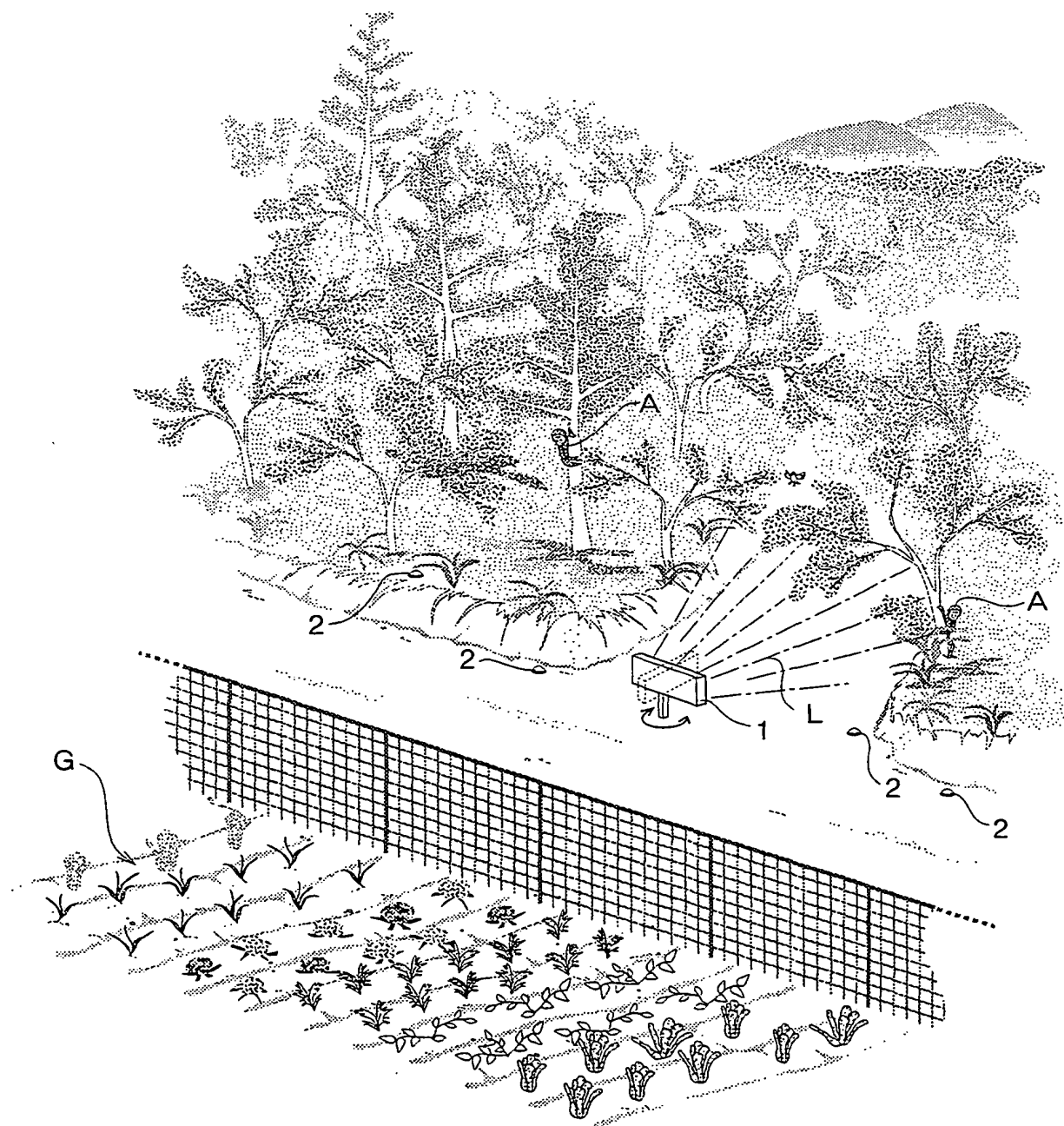


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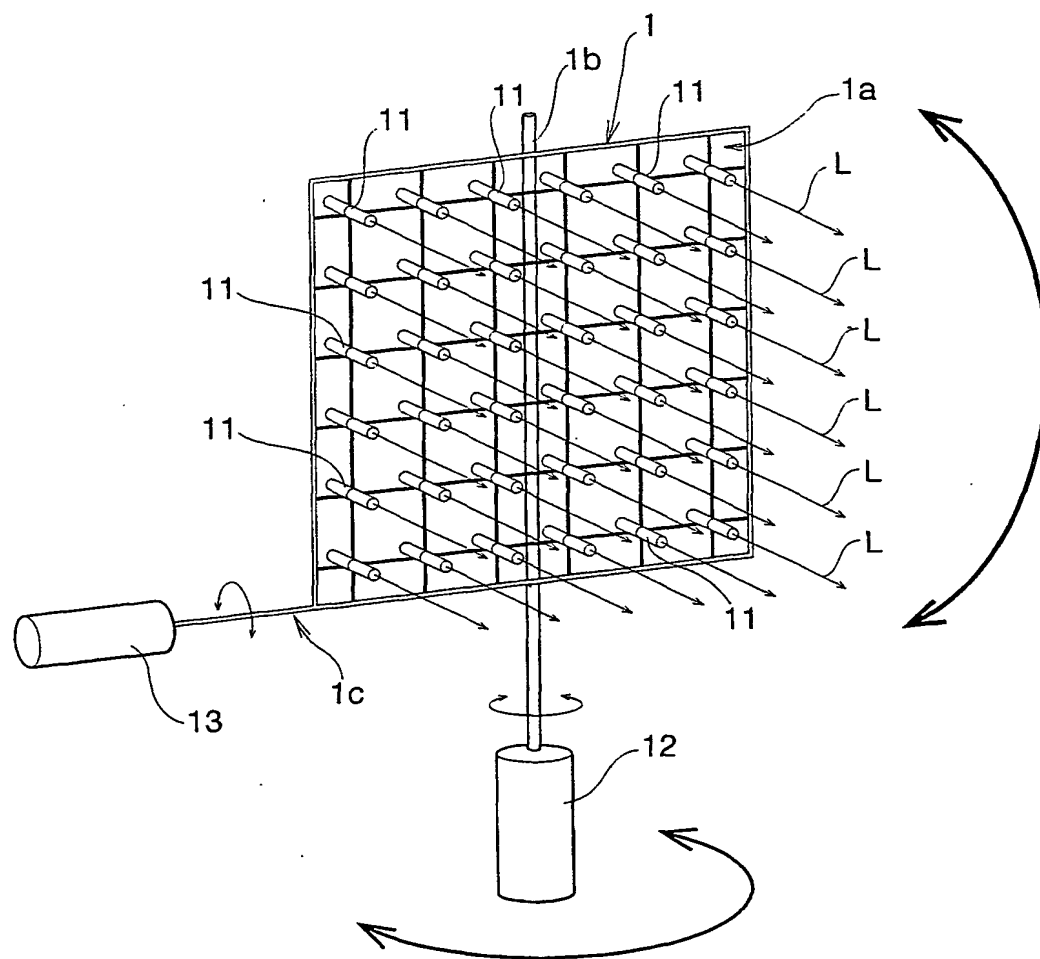
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Fig. 4



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Fig. 5



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Fig. 6

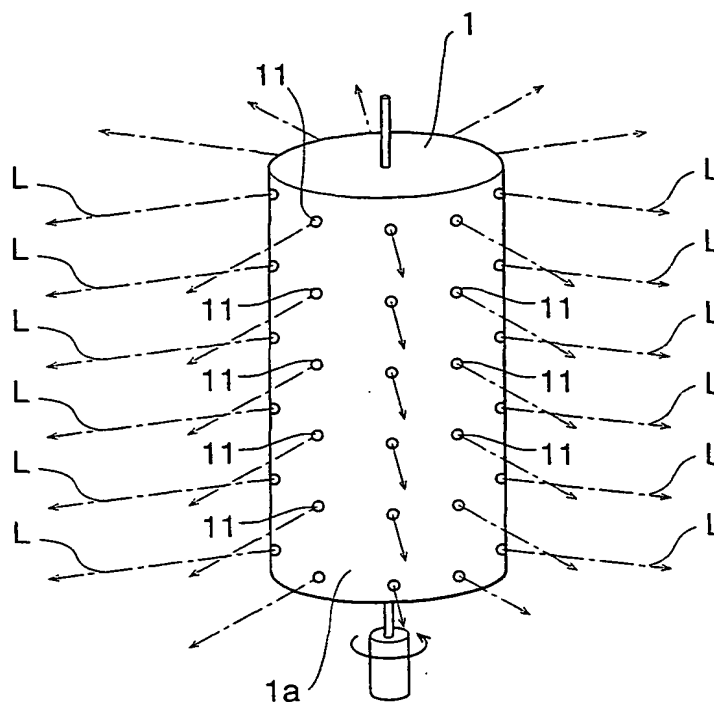
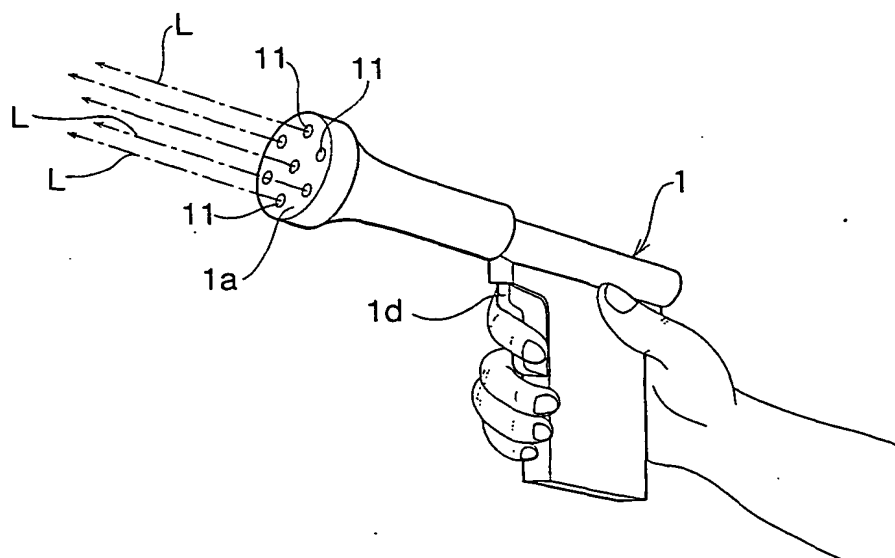


Fig. 7



INTERNATIONAL SEARCH REPORT

International Application No

PCT/JP 00/09169

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A01M29/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A01M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 619 674 A (CAZES BRUNO) 3 March 1989 (1989-03-03) claims; figures	1-3,5
X	FR 2 676 618 A (RELLE MARCEL) 27 November 1992 (1992-11-27) page 1, line 15 -page 2, line 11 claims; figures	1-3
X	DE 298 21 468 U (MERLAKU KASTRIOT) 29 April 1999 (1999-04-29) claims; figures	1,3,5
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☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PATENT ABSTRACTS OF JAPAN vol. 018, no. 553 (C-1263), 21 October 1994 (1994-10-21) & JP 06 197674 A (MASAO YOSHIDA), 19 July 1994 (1994-07-19) abstract ---	1,3,5
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/JP 00/09169

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JP 11332448	A	07-12-1999	NONE	

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